

Claims

1. An apparatus for hemodialysis, hemodiafiltration, hemofiltration or peritoneal dialysis, the apparatus comprising at least one conduit (10, 14) in which a dialysis and/or infusion fluid is intended to flow, the apparatus comprising a measurement unit (48) for measuring at least one substance in said fluid, characterised in that said substance that is to be measured is an optically active substance, wherein the measurement unit (48) is arranged to measure the concentration of said substance in said fluid by measuring the influence said substance in the fluid has on a polarised beam of light which is transmitted through said fluid.
2. An apparatus according to claim 1, including a plurality of inlets (26, 28, 30, 32) for different matters, wherein the apparatus is arranged such that the different matters introduced via said inlets (26, 28, 30, 32) will be mixed with each other in said apparatus, wherein the measurement unit (48) is positioned in or at said apparatus such that the concentration of said substance in said fluid is measured before the fluid has obtained its final form in the apparatus by being mixed with all the other matters introduced via said inlets (26, 28, 30, 32).
3. An apparatus according to claim 2, wherein said plurality of inlets (26, 28, 30, 32) include a first inlet (32) via which the fluid to be measured is to be introduced into the apparatus, wherein the measurement unit (48) is positioned in or at the apparatus such that the concentration of said substance in said fluid is measured before said fluid, that is introduced via said first inlet (32), has been mixed in the apparatus with any other matter introduced via the other (26, 28, 30) of said plurality of inlets.
4. An apparatus according to any of the preceding claims, wherein said measurement unit is designed to measure a concentration of said substance that is above 100g/l.

5. An apparatus according to any of the preceding claims, wherein said measurement unit is designed to measure the concentration of a sugar in said fluid.

5 6. An apparatus according to claim 5, wherein said sugar is glucose.

7. An apparatus according to any of the preceding claims, including means (38) arranged to generate a warning signal if the  
10 measured concentration of said substance in said fluid does not fulfil a predetermined requirement.

8. An apparatus according to any of the preceding claims, including an at least partly transparent conduit (50) in said apparatus  
15 or at an inlet (32) to said apparatus, through which transparent conduit (50) the fluid to be measured is to pass, wherein said measurement unit (48) is positioned and arranged to produce a polarised beam of light that is passed through the fluid to be measured at said at least partly transparent conduit (50).

20 9. An apparatus according to any of the preceding claims, wherein said measurement unit (48) is arranged to provide a plane-polarised beam of light.

25 10. An apparatus according to claim 9, wherein said measurement unit (48) is arranged with measurement means (38, 64, 66) that measure an entity that indicates with which angle the plane of polarisation of said polarised beam of light has rotated when said polarised beam of light has passed through the fluid.

30 11. An apparatus according to claim 10, wherein said measurement means (38, 64, 66) comprises a light intensity detector.

35 12. A system comprising an apparatus according to any of the preceding claims and a container (39) including a fluid, wherein the container (39) is connected to the apparatus such that the fluid in the container (39) is fed to the apparatus, and wherein said meas-

urement unit (48) is arranged to measure the concentration of said substance in the fluid from the container (39).

13. A system according to claim 12, wherein the container (39)

5 includes at least two compartments (42, 44), and wherein the contents of these compartments (42, 44) are to be mixed before the fluid leaves the container (39).

14. A system according to claim 12 or 13, wherein said container

10 (39) is a flexible fluid bag.

15. A system according to any of the claims 12-14, wherein the concentration of said substance in said container (39) is at least 100 g/l.

15 16. A method of carrying out a measurement of the concentration of an optically active substance in a dialysis and/or infusion fluid, which fluid is arranged to be fed to and/or through an apparatus for hemodialysis, hemodiafiltration, hemofiltration or peritoneal dialysis,  
20 the method comprising the following steps:

providing a polarised beam of light,

transmitting said polarised beam of light through said fluid,

25 26 detecting the influence that said substance in the fluid has on the polarised beam of light which is passed through the fluid such that an indication of the concentration of said substance in the fluid is obtained.

30 27 17. A method according to claim 16, wherein said substance is a sugar.

35 28 18. A method according to claim 17, wherein said sugar is glucose.

19. A method according to any of the claims 16-18, wherein said fluid is a concentrate that is to be mixed with other substances and/or diluted in said apparatus, and wherein the measurement is carried out in said fluid before the fluid, through being mixed with  
5 other substances and/or through being diluted, has obtained its final form in said apparatus.

20. A method according to any of the claims 16-19, wherein said fluid is fed to said apparatus from a container (39).

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21. A method according to claim 20, wherein said container (39) includes at least two compartments (42, 44), and wherein the contents of these compartments (42, 44) are to be mixed before the fluid leaves the container (39).

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22. A method according to claim 20 or 21, wherein said container (39) is a flexible fluid bag.

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23. A method according to any of the claims 16-22, wherein the concentration of said substance in said fluid at the position where the measurement is carried out is at least 100 g/l.

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24. A method according to any of the claims 16-23, wherein means (38) are provided to generate a warning signal if the measured concentration of said substance in said fluid does not fulfil a predetermined requirement.

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25. A method according to any of the claims 16-24, where said fluid is fed through an at least partly transparent conduit (50) in said apparatus or at an inlet (32) to said apparatus, wherein said measurement is carried out by passing said polarised beam of light through said fluid at said at least partly transparent conduit (50).

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26. A method according to any of the claims 16-25, wherein said polarised beam of light is a plane-polarised beam of light.

27. A method according to claim 26, wherein the detection of the influence that said substance in the fluid has on the polarised beam of light is done by measuring an entity that indicates with which angle the plane of polarisation of said polarised beam of light has rotated when said polarised beam of light has passed through the fluid.